MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

THN3221 – HIGH-SPEED NETWORKS

(All Sections / Groups)

24 FEBRUARY 2017
3.00 p.m. – 5.00 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 printed pages including cover page with 6 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Question 1 [10Marks]

(a) **Figure 1** shows a connection quality of an online game running on Wi-Fi network, with regards to the packet loss rate over a period of time.

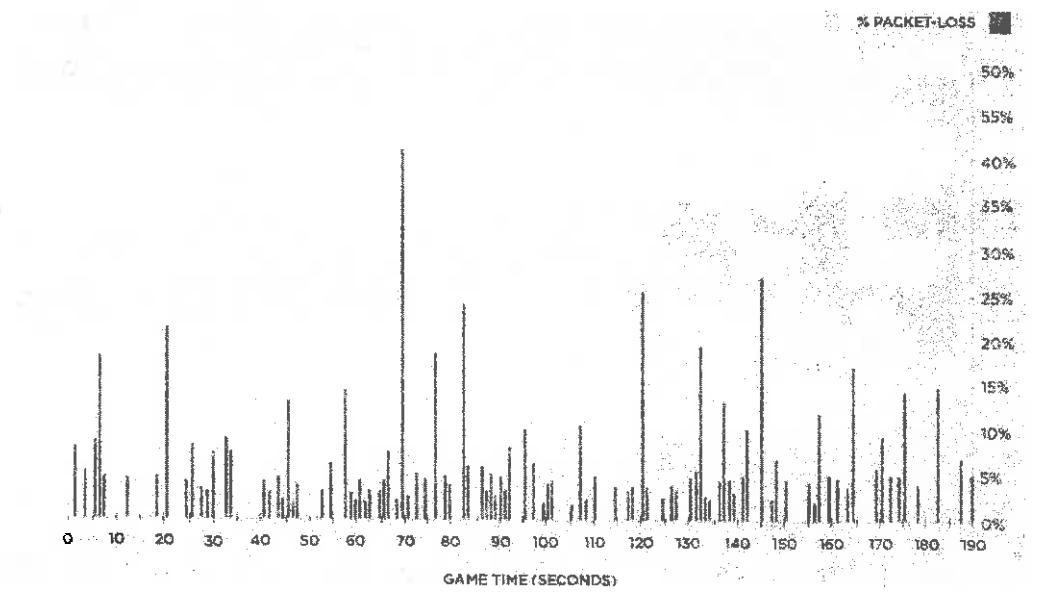


Figure 1

Suggest **ONE (1)** mechanism for reducing packet loss in this network. Justify your answer.

[3 Marks]

(b) A UDP message consisting of 65507 bytes of data and 8 bytes of header is sent to an IP layer, which will append another 20 bytes of header. This is then transmitted through two Ethernet networks; each of which uses a 26 bytes' frame header. The destination network has a maximum packet size of 1526 bytes.

(i) How many bytes, including headers are delivered to the network layer protocol at the destination?

[3 Marks]

(ii) Calculate the ratio of overhead to message for this transmission.

[2 Marks]

(c) Identify **TWO (2)** essential services stated in the X.25 standard.

[2 Marks]

Continued ...

Question 2 [10 Marks]

(a) Given device A is sending data to device B across a Frame Relay infrastructure and one of the intermediate Frame Relay switches encounters congestion.

(i) State a mechanism used for congestion control in Frame Relay network.
[1 Mark]

(ii) Explain the processes involved in the congestion control mechanism, based on your answer in Part (a)(i).
[4 Marks]

(b) AceCloud is a small size enterprise that is planning to expand their virtual storage business. They are considering two different solutions to their Storage Area Network (SAN), namely using Fiber Channel (FC) or iSCSI. Suggest which solution shall AceCloud adopt, and provide **TWO (2)** justifications for your proposed solution.
[5 Marks]

Question 3 [10 Marks]

(a) Discuss the two-layer routing problem in IP over WDM implementation.
[4 Marks]

(b) Describe the features and characteristics of SONET frames. Please include a discussion on the frame, byte, and bit transmission, as well as the format for the frames.
[6 Marks]

Continued ...

Question 4 [10 Marks]

(a) A data processing server is implementing a single-server queue mechanism. Each data frame is processed based on a first-come, first-served priority rule. On average, 150 frames per second arrive at the server. Frame arrivals are best described using a Poisson distribution. The processing server can process an average of 200 frames per second, with the processing rate being described by an exponential distribution. Calculate the following operating characteristics of the server system.

(i) The average utilization of the server.

[1 Mark]

(ii) The average number of frames in the system.

[1 Mark]

(iii) The average number of frames waiting in queue.

[1 Mark]

(iv) The average time a frame spends in the system.

[1 Mark]

(v) The average time a frame spends in a queue.

[1 Mark]

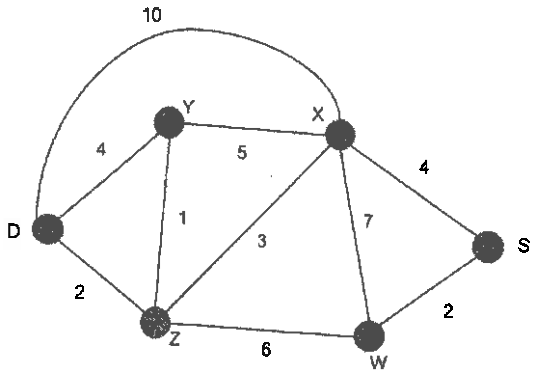
(b) Discuss the functions of timer in TCP retransmission strategy. Identify **TWO (2)** key design issue related to it.

[5 Marks]

Continued ...

Question 5 [10 Marks]

(a) Figure 2 shows a graph with six vertices connected with 10 edges.



Determine the least-cost path from S to D using Djikstra's algorithm.

[6 Marks]

(b) Briefly explain the term Autonomous System (AS). State **TWO (2)** routing protocols used in information exchange between routers within AS and in different ASs.

[4 Marks]

Question 6 [10 Marks]

(a) Describe the characteristics of RSVP protocol.

[7 Marks]

(b) List any **THREE (3)** functions of Integrated Services Architecture (ISA).

[3 Marks]

End of Page